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A model for preventing academic misconduct: evidence from a large-scale intervention

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Abstract

It is well known that students intentionally and unintentionally commit academic misconduct, but how can universities prevent academic misconduct and foster a culture of academic integrity? Based on a literature synthesis, an actionable Model for Preventing Academic Misconduct is presented. The model's basic premise is that students' voluntary participation in individual courses or academic integrity modules will have far less impact on preventing academic misconduct than required faculty or university-wide programming in core courses. In validating the model, the steps taken by the School of Business at a Canadian university to prevent academic misconduct are examined. Two online tutorials were created and implemented as required modules in the School of Business introductory core courses. Actual academic misconduct incidents recorded by the University from 2016 to 2021, a three-year pre-intervention period and a two-year post-intervention period partly covering the COVID-19 outbreak, are used to gauge the model's effectiveness in preventing academic misconduct. The findings are discussed through a Social Learning Theory lens: the high-level implementation gives rise to a culture of academic integrity propelled by the establishment of common knowledge.

Keywords: Academic Misconduct, Model, Institutional Data, Intervention analysis, University

Introduction

Academic misconduct among students is becoming a growing concern in higher education institutions worldwide (Sefcik et al. 2020; Stephens et al. 2021), with severe consequences for the institution and the individual (East and Donnelly 2012). From the education market's perspective, widespread academic misconduct inevitably raises questions about the institution's reputation (East and Donnelly 2012) regarding assurance of learning, the value of degrees awarded, and the institution's overall brand. Unfortunately, many higher education institutions lack the systematic approach necessary to prevent academic misconduct and foster a culture of academic integrity. However, there is little guidance to receive from the literature as there are almost no studies evaluating



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large-scale academic integrity interventions in higher education institutions using actual institutionally reported academic misconduct incidents (Newman 2020). Most empirical studies are based on self-reported student surveys (e.g., Curtis and Tremayne 2021 and Stephens et al. 2021).

In the past, many universities implemented academic integrity activities as a form of punishment for academic misconduct offenders (Park 2003; Stephens et al. 2021), a reactive approach. Over the following decades, the approach changed to a more proactive educational approach (Park 2003; Sefcik et al. 2020; Stephens et al. 2021). In this line of thought, the School of Business at MacEwan University, Canada, made a venturesome decision to ensure that students have a solid awareness and understanding of MacEwan University's Academic Integrity Policy via Park's Educational Awareness Approach (Benson et al. 2019; Park 2003). The School of Business designed and implemented two online academic tutorials as required modules in all its Business Baccalaureate, Diploma, and Certificate programs. These tutorials entail an Academic Integrity E-Learning and an APA (American Psychological Association) Citation and Referencing tutorial, embedded as mandatory assignments in the School of Business core courses. Both tutorials are required and graded course components for all students. Students complete these two tutorials and receive two certificates of completion in exchange for a 10% course mark, and the certificates must be completed within three weeks from the course start.

This paper introduces a conceptual Model for Preventing Academic Misconduct to provide higher education institutions with a much-needed systematic framework for reducing academic dishonesty. Based on a synthesis of the academic integrity literature, the three-dimensional model provides hypothesized predictions along the axes of *Level of Implementation*, *Time*, and *Impact*. To assess the model's effectiveness, we examine the approach taken by the School of Business at MacEwan University, Canada. Actual academic misconduct incidents within the School of Business, as recorded by the University's Academic Integrity Office, are traced over six years, from 2016 to 2021, a period that covers the time before and after the implementation of the mandatory academic integrity training and also covers the outbreak of the COVID-19 pandemic. The data is analyzed and discussed to assess the model's effectiveness in preventing and reducing academic misconduct incidents.

In exploring the effectiveness of this model, this paper contributes to the literature on academic integrity by providing managerial insights for higher education administrators and faculty to prevent academic misconduct and foster a culture of academic integrity. This study is one of the few that uses institutional data on actual academic misconduct incidents to evaluate the effectiveness of an academic integrity intervention within a higher education institution at the school or faculty level.

How can higher education institutions remedy academic misconduct?

For over half a century, the causes of academic dishonesty among higher education students have been sought to be understood. Factors such as faculty apathy, poor time management skills and laziness on the part of students, as well as the need to attain high grades and the limited penalties for cheating, have all been identified as potential contributors (Bowers 1964; Ellery 2008; Galloway & Connor 2015; Groark et al. 2001; Hodgkinson et al. 2016; McCabe et al. 2001). A related question is the

optimal design mix of academic integrity interventions to combat cheating effectively, including such considerations as proactive vs. reactive measures, content, voluntary vs. mandatory participation, modality, and level of implementation: from individual courses to university-wide interventions (East and Donnelly 2012; Sefcik et al. 2020; Stephens et al. 2021).

In voluntary academic integrity training, fewer students and faculty will participate. This modality will likely translate into a negligible impact on reducing academic misconduct at the institutional level. This situation holds, for instance, when universities provide open-access academic integrity and citation tutorials in which students can self-enroll. Some researchers (McDonald 2004; Ritter 2006) have stated that offering 'small-scale' ethics training will have insignificant results in achieving intended ethical outcomes. This scenario applies when employing academic integrity training in random courses, even if it is a required component. There is no unified institutional requirement, and only a small percentage of the student body is impacted. Unfortunately, schools and faculties are typically unsuccessful in garnering full-fledged support from faculty to implement academic integrity interventions and instead resort to small-scale activities with dismal outcomes (Jewe 2008; Jonson et al. 2015; McDonald 2004; Rest et al. 2000; Ritter 2006; Waples et al. 2009).

Substantial reductions in instances of academic misconduct are unlikely to be discernible until academic integrity initiatives become mandatory elements within departments or programs, thereby ensuring a broader student exposure to the principles of academic integrity (Benson et al. 2019). Brown et al. (2008) further emphasized that the impact of obligatory academic integrity training within course requisites surpasses that of voluntary, open-access tutorials. A more pronounced effect is attainable when academic integrity activities are integrated as compulsory components at the school or faculty level, facilitating widespread student engagement with the notions of academic integrity. Over multiple years, this may culminate in the emergence of an 'ethical community' (McCabe et al. 2001). Nonetheless, it is only through the institution-wide imposition of academic integrity programming across the entire student body that effective prevention of academic misconduct can be achieved.

Almost 60 years ago, Bowers (1964, p. 1960) acknowledged that 'the most important determinant of change in cheating behaviour between high school and college is the level of disapproval of cheating among the student's peers.' McCabe and Trevino (1993) furthermore asserted that it is crucial for universities to have programs to distribute and explain academic integrity policies in the hopes of obtaining strong support from both faculty and students. Despite these early assertions, little research on institution-wide activities to prevent academic misconduct has been published. One area that has received some focus is institutional honour codes. However, McCabe et al. (2012) found inconclusive results when comparing higher education institutions with honour codes and higher education institutions which do not have honour codes in reducing academic misconduct.

In reviewing 21 articles on academic integrity interventions, Stoesz and Yudinseva (2018) found that students generally improved their knowledge of the types of academic misconduct and institutional policies about academic integrity. However, they did not specifically reference whether the academic integrity activities were voluntary, random

events and courses, required, or institution-wide. Similarly, Ives and Nehrkorn (2019) reviewed 97 studies spanning interventions such as text-matching software, honour codes, exam proctoring, and academic integrity training. The combined evidence for the 10 studies dealing with academic integrity training suggests that this modality is ineffective. However, only two of the included studies measured output as changes in behaviour, and none used institutional data on actual misconduct incidents. Moreover, it is not explicitly noted whether the activities were voluntary or required or were institution-wide or random events and courses.

When integrating the predictions of the literature, there is a discernable pattern where the impact in preventing academic misconduct will be more significant for mandatory large-scale academic integrity training. The implementation level helps form an informed peer group that can exert peer pressure on fellow students through their disapproval of academic misconduct. Also, consistent mandatory academic integrity training over time will aid in creating an ethical community with shared values.

Conceptual model

The literature review suggests a three-dimensional Model for Preventing Academic Misconduct, as presented in Fig. 1. The model depicts *Level of Implementation* as an input variable on the *X*-axis. The Level of Implementation spans voluntary activities where students self-enroll in academic integrity training over required components in random courses, Department or Program-level requirements, School and Faculty-level implementation, and University-wide mandatory activities for all students and faculty. With an increasing level of implementation along the *X*-axis, the hypothesized impact on preventing academic misconduct will increase: from low impact obtained through voluntary participation by students and faculty members to high impact in required University-wide programming. On the *Z*-axis is the other input variable, *Time*. It captures that with increasing time after consistent academic integrity programming, the hypothesized impact on preventing academic misconduct will increase, in line with the time it takes to create an ethical community (McCabe et al. 2001), here interpreted as a culture of academic integrity.

MacEwan University's approach to academic integrity

At MacEwan University, academic integrity is a commitment to six fundamental values: courage, fairness, honesty, respect, responsibility, and trust. Consequently, academic misconduct is any act in which a person participates to gain an unfair academic advantage. The scope of these actions at MacEwan University includes cheating, fabrication, falsification, improper collaboration, multiple submissions, plagiarism, helping or attempting to help another person obtain an unfair academic advantage or any other form of getting an unfair academic advantage (MacEwan University, 2019).

Initially, the APA tutorial created and implemented in 2013 was only used as a reactive measure for students who had committed academic misconduct. After internal administrative discussions, the goal changed to embrace a more proactive educational approach, a change often seen among higher education institutions (Chew et al. 2015; Groark et al. 2001; McCabe et al. 2001). The APA tutorial contains substantial content about academic integrity. Students found guilty of non-severe (plagiarism) academic misconduct

A MODEL FOR PREVENTING ACADEMIC MISCONDUCT

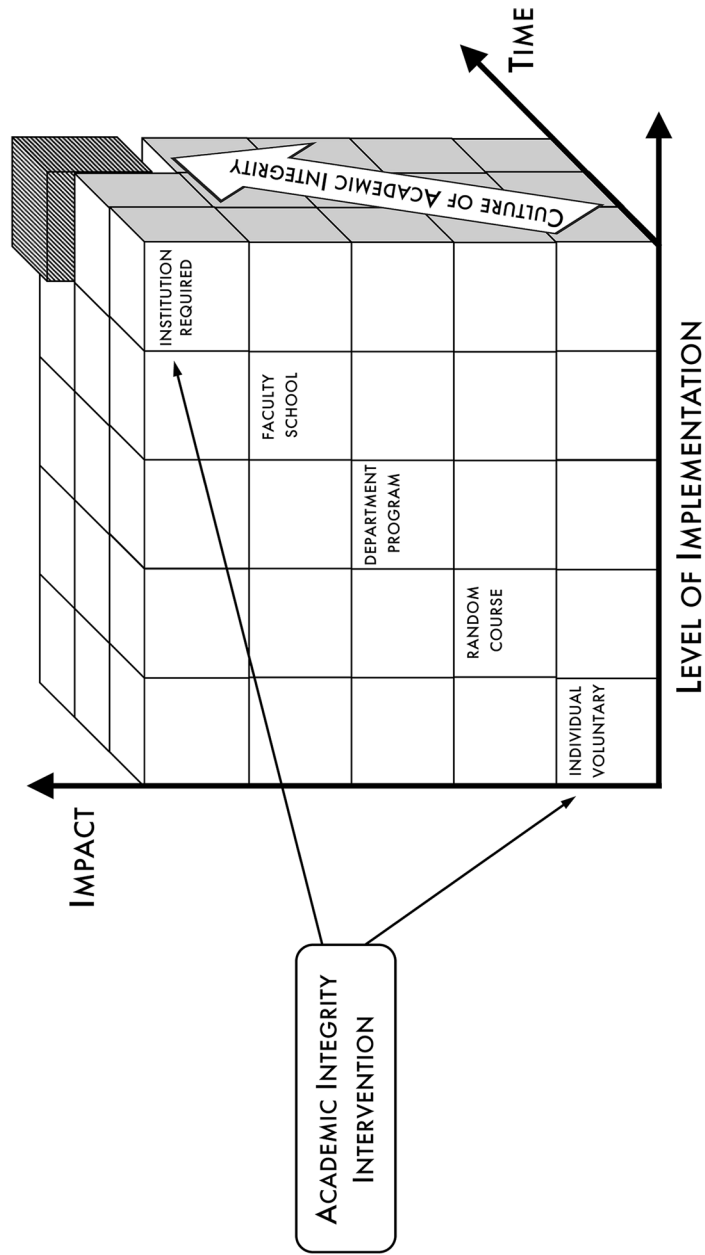


Fig. 1 The figure displays the output variable *Impact* on the Y-axis, capturing the hypothesized effect size on preventing academic misconduct. The most material impact is expected when *Time* after implementing academic integrity programming is high so that a culture of academic integrity has been established and when *Level of Implementation* is high, as in an institution-wide requirement. A low impact is hypothesized when the academic integrity programming has just started and when *Level of Implementation* is low, as in voluntary academic integrity programming by individual students. The optimal impact in preventing academic misconduct is hypothesized to happen along the space diagonal of the model, where both *Level of Implementation* and *Time* are increasing simultaneously, with the terminus depicted by the dark cube

were required to complete the APA tutorial as a learning experience. It was also available University-wide through the learning management system Blackboard Learn (since changed to Moodle). Some faculty had their students complete it as part of their course grades, and any student could go on Blackboard Learn and complete the APA tutorial as a voluntary self-enrollment. In the fall of 2018, the APA tutorial was revamped and updated. Instead of just focusing on student offenders, the new thinking on proactive interventions inspired the continued use of the APA tutorial and, in addition, the creation of a new Academic Integrity E-Learning tutorial for the advancement of academic integrity education and academic integrity misconduct prevention amongst all MacEwan University students (Benson et al. 2019). Strong implementation fidelity of the academic integrity intervention is a desirable feature which will result in more successful outcomes (Ives and Nehr Korn 2019). Therefore, using a scalable and well-designed Academic Integrity E-Learning tutorial with appropriate content that all students receive will aid in this regard.

A comprehensive pilot project was implemented in January 2019 to provide guidance and feedback while creating the content and the design for the new Academic Integrity E-Learning tutorial (Benson et al. 2019). E-learning generally refers to using technology to access educational content and facilitate learning activities outside a traditional classroom setting through digital tools such as web-based platforms and learning management systems. It can encompass several media types and be self-paced or instructor-guided (Mayer 2014). The new Academic Integrity E-Learning tutorial used Articulate 360 (Rise) software which offers embedding features and pre-built interactions such as card sorting, flashcards, checks, click-through processes, and pre-built timeline features. It can also be inserted in all forms of media and hosted on MacEwan University's learning management system, Blackboard Learn.

The Academic Integrity E-Learning tutorial is based on E-Learning pedagogy (Benson et al. 2019). This pedagogy includes principles of shaping and reinforcing, so when a student answers a question incorrectly, the screen flashes 'incorrect' in red, explaining why the given answer is deemed incorrect. As the student progresses in each module, the student is asked fill-in-the-blank questions and answers multiple-choice or match questions (Moore 2013). An anchoring figure, the narrator throughout the tutorial, is used as the anchoring figure enhances the tutorial's retention and comprehension (Bates 2015). The anchoring also chimes in to alert the student to 'things to watch for,' which is linked to better retention (Bates 2015). All modules use visual exhibits to display the entirety of each module first. This mental map helps students to form a hierarchical order which aids in students' learning (Schunk 2012). Questions are inserted as advance organizers, triggering pre-existing concepts and allowing students to learn new information more quickly (Ausubel 1960).

Participants in the pilot project of developing the Academic Integrity E-Learning tutorial were a convenience sample from business core courses. A total of 34 third-year students volunteered to participate in the study in exchange for a 2% bonus in their final course grade. In participating, students had to (1) complete the 25-question pre-test survey on academic integrity, (2) complete the Academic Integrity E-Learning tutorial, (3) complete the 25-question post-test survey on academic integrity, and (4) provide in-depth feedback on one of the four Academic Integrity E-Learning modules (Benson et al.

2019). As part of the continuous improvement of the Academic Integrity E-Learning modules, quantitative and qualitative student feedback was collected on ease of content understanding, clarity of instructions, ease of navigation, and whether the design and layout made the content engaging. Students used a 5-point Likert scale from '1-Strongly Disagree' to '5-Strongly Agree' to provide quantitative feedback on the primary areas and also gave qualitative feedback on the same areas. Students were also asked to provide open-ended feedback on what content they found most helpful in the academic integrity modules, what content they would like more information about, and their suggestions on module changes (Benson et al. 2019). Student feedback was overwhelmingly positive, with a total combined score for the four modules of 90%. This result generally indicated that students found the Academic Integrity E-Learning tutorial easy to understand with clear instructions, easy to navigate, and having a design and layout that made the content engaging. However, based on a percentage criterion cutoff standard of 90% for each module, it was determined that Module 2 (85.2%) needed further analysis and development. The Ease of Navigation (87.5%) and Module Layout/Design (87.5%) for all four modules were also deemed to need in-depth reviews (Benson et al. 2019).

The Academic Integrity E-Learning tutorial designer reviewed the findings in detail and discussed the results with the Academic Integrity Officer at MacEwan University. Revisions were made, and the content of the Academic Integrity E-Learning tutorial was finalized. At current, the Academic Integrity E-Learning Tutorial features the following modules.

Module 1: Introduction to Academic Integrity familiarizes the student with a general understanding of academic integrity and academic misconduct, defining them and explaining why they are essential to university students. It also presents material on how academic norms differ between the university and high school in sharing notes and assignments and redoing high school assignments after teacher feedback.

Module 2: Plagiarism and Citation Basics reviews giving credit to another person for their ideas and how to paraphrase, quote, and summarize concepts. It also provides information on where students can go for help with their assignments at the MacEwan University Writing Centre.

Module 3: Misconduct Beyond Plagiarism asks students, 'Why would I cheat?' It then focuses on the academic misconduct offences of the MacEwan University Academic Integrity Policy, including plagiarism, cheating, contract cheating, fabrication and falsification, improper collaboration, multiple submissions, helping others obtain an unfair academic advantage and any other form of getting an unfair academic advantage. A new section titled 'Can I use online services for my assignments?' was added because internet-facilitated cheating is rising. Students need to be aware of the kinds of services the University permits and do not permit.

Module 4: What happens in a violation outlines what will happen if a student is suspected of academic misconduct. It thoroughly reviews the procedures and student rights in this process. It also links the student to the MacEwan University Academic Integrity Policy so the student may read it.

Finally, each Academic Integrity E-Learning module offers a certificate of completion. To achieve this, a student must pass each module with a grade of 85% before proceeding to the next module. Content-wise, the tutorial is similar to the online

academic integrity course at the University of Auckland, New Zealand (Stephens et al. 2021). It is also similar to the suite of modules at La Trobe University, Australia, with the addition that they include a module to train faculty and staff about responsibilities and how the institution responds to academic misconduct (East and Donnelly 2012).

Methodology and data

This study measures the results of the change in the number of institutionally reported student academic misconduct violations over time. The analytical frame is a quasi-experimental research design, similar to the approach of Stephens et al. (2021) when evaluating the effect of the University of Auckland's academic integrity course on student perceptions and stated behaviour. As such, the three-year pre-intervention period forms the natural control group. During this time, the AI and APA tutorials did not exist, and the School of Business relied on initiatives in random courses and assignments to teach academic integrity. In other words, following the Model for Preventing Academic Misconduct (Fig. 1), the pre-intervention period featured a low *Level of Implementation* and *Impact*. The two-year post-intervention period in which the AI and APA tutorials were implemented forms the natural experimental or treatment group. During this period, the *Level of Implementation* and *Impact* was high, per the Model for Preventing Academic Misconduct (Fig. 1). Thus, comparing the two time periods in terms of institutionally reported academic misconduct violations involves assessing the model's anticipated outcomes in preventing academic misconduct. Over the five-year study period, enrollment in the School of Business remained nearly constant, with a coefficient of variation of less than 0.06.

The baseline measure average for the three-year pre-intervention period is compared to the results over the two-year post-intervention period. The baseline measure is established by averaging the recorded total student academic misconduct incidents for the School of Business for the academic years 2016–2017, 2017–2018, and 2018–2019. This baseline measure is then compared to the reported total academic misconduct violations for the School of Business in the two-year post-intervention period, the academic years 2019–2020 and 2020–2021. Thus, the control group is all students in the School of Business who engaged in academic misconduct and were reported to the Academic Integrity Officer during the pre-intervention period when the *Level of Implementation* and *Impact* was low. Consequently, the treatment group comprises all students in the School of Business who engaged in academic misconduct and were reported to the Academic Integrity Officer in the post-intervention period when the *Level of Implementation* and *Impact* was high.

The data obtained from the Academic Integrity Office at MacEwan University covers all recorded academic misconduct incidents for the School of Business between 2016 and 2021, a total of five academic years. It contains the total number of incidents per year and a breakdown of the number of incidents by year of study: first, second, third, or fourth-year student. The data also includes a breakdown of the number of academic misconduct incidents by type of offence: plagiarism, cheating, improper collaboration, multiple submissions, fabrication, falsification, contract cheating, and unfair advantage.

Preliminary results

The reported academic misconduct incidents for the five years are exhibited in Table 1. The results generally suggest higher levels of academic misconduct violations in the pre-intervention period, other than the academic year 2017–2018. From a peak of 128 violations in 2016–2017, there is a stark recovery to 2017–2018, with essentially only half the number of violations, 67. The numbers reestablished higher in 2018–2019, with 92 reported academic misconduct violations. The pre-intervention baseline amounts to some 95 academic misconduct incidents. For the first year in the post-intervention period, 2019–2020, the School of Business exhibited a 40% decrease in reported academic misconduct incidents compared to the baseline. The second year of the post-intervention period, 2020–2021, resulted in a 17% decrease in reported academic misconduct incidents compared to the pre-intervention 3-year baseline. It should be noted, however, that February 2020 saw the outbreak of COVID-19 when MacEwan University switched modality to online delivery of courses. This event could have impacted the likelihood of engaging in academic misconduct and the number of academic misconduct incidents.

Figure 2 shows the plotted reported number of academic misconduct incidents over the five-year period, 2016–2021, along with the pre-intervention 3-year baseline of 95 academic misconduct incidents. The drastic drop in reported academic misconduct incidents is visible from the pre-intervention to the post-intervention period.

Table 1 Reported academic misconduct incidents – school of business

	Pre-Intervention AI and APA			Post-Intervention AI and APA	
	2016–2017	2017–2018	2018–2019	2019–2020 Year 1	2020–2021 Year 2
Total	128	67	92	57	79
	Pre-Intervention 3-Year Baseline <u>95.67</u>			Change compared to Baseline	
				-40%	-17%

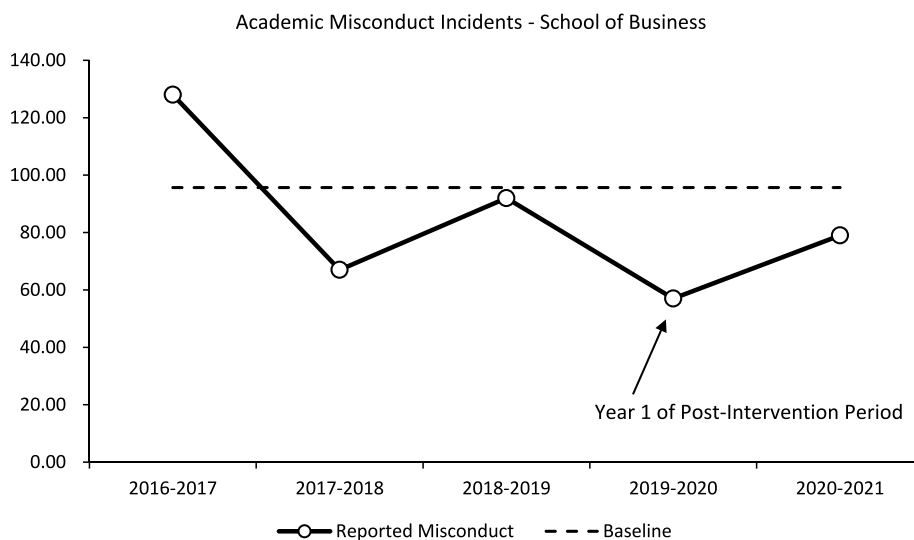


Fig. 2 Academic misconduct incidents and baseline - School of Business

The data can be examined in greater granularity by isolating the impact of the academic integrity intervention on students by year of study. For instance, is there a difference between first-year and second-year students on the impact of academic misconduct? Table 2 tabulates the reported academic misconduct incidents by year of study. Compared to the baseline, first-year students had a decrease of 54% in academic misconduct incidents in the first year of the post-intervention period, followed by a 27% decrease in the second year. Second-year students saw a 47% decrease in academic misconduct incidents in the first year, followed by a 75% decrease in the second year of the post-intervention period.

Third and fourth-year students did not receive the Academic Integrity E-Learning and APA tutorials, and compared to first and second-year students, exhibited increases in academic misconduct incidents. Third-year students had a 162% increase in the first year of the post-intervention period and a 312% increase in the second year compared to the 3-year baseline average. In contrast, fourth-year students saw a 61% increase in the first year and a 384% increase in the second year of the post-intervention period.

The data allows for further analysis regarding the number of academic misconduct violations. Table 3 delves deeper into the specific types of academic misconduct incidents over the pre-intervention and post-intervention periods. Overall, the three-year baseline of reported plagiarism violations in the School of Business was 40 incidents per year, compared to 21 incidents for the first year of the post-intervention period, the 2019–2020 academic year, a 48% decrease. In the second year, the plagiarism violations were 34 incidents, corresponding to a 16% decrease. Cheating exhibited a similar pattern, a 49% decrease for the first post-intervention year and an 18% decrease in the second year. The results for multiple submissions were a 100% reduction in both years of the post-intervention period. Falsification and fabrication had an 88% decrease in the first year of the post-intervention period and a 77% decrease in the second year. The category of improper collaboration had a 20% increase in the first year and a 56% increase in the second year compared to the baseline. Last, for the category of unfair advantage, the post-intervention period had an 80% increase in the

Table 2 Reported academic misconduct incidents by year of study – school of business

	Pre-Intervention AI and APA			Post-Intervention AI and APA	
	2016–2017	2017–2018	2018–2019	2019–2020	2020–2021
				Year 1	Year 2
1st Year	65	39	53	24	38
2nd Year	54	20	35	19	9
3rd Year	4	2	2	7	11
4th Year	5	6	2	7	21
Total	128	67	92	57	79
	Pre-Intervention 3-Year Baseline			Change compared to Baseline	
1st Year	52.33			-54%	-27%
2nd Year	36.33			-47%	-75%
3rd Year	2.67			162%	312%
4th Year	4.33			61%	384%

Table 3 Reported academic misconduct incidents by type – school of business

	Pre-Intervention AI and APA			Post-Intervention AI and APA	
	2016–2017	2017–2018	2018–2019	2019–2020 Year 1	2020–2021 Year 2
Plagiarism	55	36	31	21	34
Cheating	15	10	34	10	16
Improper Collaboration	20	14	16	20	26
Multiple Submission	10	5	9	0	0
False/Fabrication	25	1	1	1	2
Contract Cheating	0	0	0	2	0
Unfair Advantage	3	1	1	3	1
Total	128	67	92	57	79
	Pre-Intervention 3-Year Baseline			Change compared to Baseline	
Plagiarism	40.67			-48%	-16%
Cheating	19.67			-49%	-18%
Improper Collaboration	16.67			20%	56%
Multiple Submission	8.00			-100%	-100%
False/Fabrication	9.00			-88%	-77%
Contract Cheating	0.00				
Unfair Advantage	1.67			80%	-40%

first year but a 40% reduction in the second year. For contract cheating, the baseline measure is too small to make a meaningful comparison.

Discussion

This paper introduced a Model for Preventing Academic Misconduct based on synthesizing and integrating the academic integrity literature. The hypothesized predictions of the model are that school, faculty, or university-wide mandatory implementations will have a more material *Impact* in preventing academic misconduct than voluntary enrollment or obligatory components in random courses captured through the input variable *Level of Implementation*. *Time* enters the model through the creation of a culture of academic integrity that happens over time.

To evaluate the model, the impact of the academic integrity training implemented at the School of Business, MacEwan University, Canada, was examined. Five years of actual academic misconduct incidents at the School of Business obtained from the University’s Academic Integrity Office were analyzed. The data sequence contains three years of a pre-intervention period and two years of a post-intervention period, with information on the total number of incidents distributed over academic years, year of study, and type of academic misconduct. The data set is limited and partly covers the COVID-19 outbreak, so the intervention’s impact should be interpreted conservatively. Therefore, our perspective is that the empirical findings indicate that the School-wide academic integrity intervention—the Academic Integrity E-Learning and APA tutorials—in core courses were effective in preventing academic misconduct. The results for the total number of incidents suggest that academic integrity programming as part of the course requirements for introductory business courses had an immediate impact on preventing

academic misconduct within the first year of implementation (40% decrease) and the second year (17% decrease).

The results thus far suggest that required school or faculty activities in core courses prevent academic misconduct in that school or faculty more than random voluntary and mandatory activities. The development of academic misconduct incidents by year of study proposes that the required academic integrity programming prevented academic misconduct among first-year students (54% decrease) and second-year students (27% decrease) within the first year of implementation. The impact carried on to the second year in the post-intervention period, where first-year students (47% decrease) and second-year students (75% decrease) saw material decreases in academic misconduct. The results herein correspond to earlier research findings that younger students—here approximated by their year of study standing—are more likely to engage in academic misconduct (McCabe et al. 2012). Third and fourth-year students, who were not included in the intervention, instead exhibited substantial increases in academic misconduct incidents during the post-intervention period, overlapping with the COVID-19 outbreak, where the University switched to online delivery. This finding lends some further support to the model.

Notably, when examining the types of academic misconduct, there was an upward trend in instances of improper collaboration during both years of the post-intervention period. This timeframe coincides with the emergence of the COVID-19 pandemic and a shift to online instruction across all courses. One plausible interpretation of this finding is that the circumstances brought about by the pandemic caused students to become more disengaged, possibly resulting in diminished feelings of accountability. Consequently, this environment may have contributed to heightened collaboration and information exchange, driven by the incentive to accumulate points (Parker et al. 2021).

We argue that establishing ‘common knowledge’ is a fruitful way to understand and theorize how the academic integrity intervention operates (Lewis 1969). If implemented at high levels, the academic integrity intervention—over time—gives rise to a culture of academic integrity. The engine of this transformation is common knowledge (Lewis 1969), in that the academic integrity intervention ensures that everyone knows of academic integrity and everyone knows that it is common knowledge. The common knowledge about the principles of academic integrity and the wrongdoing of engaging in academic misconduct creates a shared cultural capital. When the cultural capital of academic integrity has been established, it facilitates communication and collaboration among students. This exchange sparks social learning among students (Bandura & Walters 1977). Students will actively frown upon cheating and discuss it with their fellow students (McCabe et al. 2012). Therefore, it can be argued that common knowledge, established via the academic integrity intervention, is necessary for social learning to occur and that social learning is necessary for observing a positive impact on the prevention of academic integrity.

This study contributes to the academic integrity literature by proposing a Model for Preventing Academic Misconduct and being one of the few studies using actual institutionally reported academic misconduct incidents to evaluate a school or faculty-wide academic integrity intervention. We used the data to assess the proposed Model for Preventing Academic Misconduct; overall, the School-level results suggest that the model

leads to a School-level reduction in academic misconduct in line with the hypothesized predictions of the model. A limitation of this study is the small and aggregate data set, where the post-intervention period only covers two years.

Implications for practice and future research

Academic integrity should permeate all higher education institutions and is inseparable from the institutions' assurance of learning, value proposition, and brand. Nevertheless, higher education institutions often lack unified preventive approaches that signal to stakeholders—students, faculty, designation bodies, and society—that academic integrity is a core priority, evidenced by meaningful data. For higher education institutions to have a salient brand in the tightening market for post-secondary education, we recommend high-level implementation—according to the Model for Preventing Academic Misconduct. Specifically, higher education institutions need to (I) ensure that the content of their academic integrity policies reaches the state of common knowledge among students, faculty, and staff via carefully designed academic integrity tutorials.

We welcome the change in focus from reactive, punitive strategies to proactive ones but firmly believe that proactive and reactive strategies must coexist to uphold academic integrity. The proactive approach brings awareness about the institution's academic integrity policies and educates students about forms of academic misconduct to ensure they will not accidentally commit academic misconduct (East & Donnely 2012). However, reactive approaches also belong in an ethical system to ensure deterrence, restore trust, ensure fairness, uphold integrity, and discourage unethical behaviour.

The hypothesized predictions of the Model for Preventing Academic Misconduct suggest that academic integrity interventions with higher levels of implementation, such as school, faculty or university-wide, will be more effective than initiatives in random courses and assignments. This result is tentatively supported via the natural experiment at the sample level for the School of Business. The high level of implementation and the use of online e-learning to teach academic integrity comes with the added benefit of high implementation fidelity: a consistent message. At the same time, we realize the inherent tension between academic integrity interventions designed to run at high levels of implementation across subject matter fields and articulations of academic integrity content that is more specific and perhaps more relatable. Furthermore, it has been suggested that a central delivery of academic integrity modules, where the intervention is not embedded within a specific course, can result in a failed learning transfer (Stephens et al. 2021).

A way to resolve this tension is to embed the institution-wide required academic integrity module as required content in core courses and use this content as a starting point for localized course discussions (East & Donnely 2012), which is the approach we used at the School of Business, MacEwan University. In general, we recommend a multimodal and multichannel strategy across proactive and reactive measures to obtain buy-in from all stakeholders and form a culture of academic integrity. Consequently, and similarly described in this paper, this means starting with a collaborative process in developing and designing academic integrity interventions, as East and Donnely (2012) and Sefcik et al. (2020) recommend. Then, ensure that all stakeholders—students, faculty, and

staff—receive the academic integrity training with high-level implementation and a consistent message, complemented by localized applied content and discussions.

It is vital to avoid academic integrity interventions and corresponding knowledge tests becoming an act of meeting requirements but instead emphasizing the *whys* and underlying values, noting that foundational academic integrity understanding is linked to future professional success (Sefcik et al. 2020). We believe that an avenue to achieve a value-oriented approach to academic integrity is to more closely link academic integrity to the professional competencies of the graduate profile (e.g., Benson and Enstroem 2017), which, in turn, can be linked to the professional conduct requirements of industry licensing and designation bodies.

Efforts by educational institutions to cultivate a culture of academic integrity must be accompanied by tangible evidence to assess their causality, effectiveness, and progress, ultimately yielding a return on the investment made in promoting academic integrity. Unfortunately, such evidence is usually lacking. Despite a growing number of institutions providing academic integrity training, even basic metrics like completion rates are often not collected (Sefcik et al. 2020). Several components need consideration to establish a robust data analytics strategy for academic integrity, including defining objectives and key performance indicators (KPIs), collecting and integrating data, ensuring data quality and governance, employing appropriate data analysis techniques, and producing comprehensive reports.

To identify relevant KPIs, we propose using Kirkpatrick's Evaluation Model, which encompasses four levels: Reaction, Learning, Behavior, and Results (Kirkpatrick and Kirkpatrick 2006). At the Reaction level, participants' initial satisfaction with academic integrity interventions would be gauged through perceptions, opinions, and attitudes. The Learning level would measure participants' academic integrity knowledge improvement through pre- and post-tests or quizzes. The objective of the Behaviour level would be to track changes in behaviour by monitoring institutionally reported academic misconduct incidents. Finally, at the Results level, the broader impacts of academic integrity interventions should be measured, including long-term trends in academic misconduct incidents, institutional reputation, and the perceptions of external stakeholders such as employers and accrediting bodies. This final measure is intrinsically linked to the mission and vision of the higher education institution. Notably, extant evaluations of academic integrity intervention seldom progress beyond Kirkpatrick's initial two levels of Reaction and Learning, diminishing the impact assessment's meaningfulness.

In measuring knowledge at the learning level, we recommend that (II) higher education institutions monitor both the development of (a) personal knowledge related to academic integrity via repeated measurements and (b) common knowledge through items that measure *beliefs of others' knowledge*. Automating the collection of this data via participation in the academic integrity e-learning modules ensures the continuous update of the institution's state of knowledge among faculty and students and opportunities to refine the measurements. The main point of this paper is that academic integrity interventions need to be mandatory, at least at the school and faculty levels, to have a noticeable impact. Therefore, the recommendation is to (III) start piloting them within individual departments and implement them institution-wide when the design has been sufficiently tested and evaluated. As academic misconduct is more widespread among

younger students, the recommendation would be to (IV) embed the academic integrity intervention as part of the requirement of mandatory introductory courses that all students take. Consistency in format across time is also an aspect of implementation fidelity and facilitates the creation of a culture of academic integrity. Therefore, (V) the institution should maintain a consistent approach for the best impact over time. This approach also serves as a clear signal to internal and external stakeholders that the institution fully protects academic integrity, which will positively impact its brand.

Using approaches founded on meaningful impact inevitably requires data to evidence impact. Higher education institutions, therefore, need to (VI) set up an infrastructure and standardized data reporting that classifies the type of academic misconduct, context, program, year of study, and date. Using a student-unique identification number ensures that the institution can evidence impact on repeating academic misconduct offenders and will also allow for in-depth analysis to improve the academic integrity intervention. This setup allows for increased penalties for students who have taken the academic integrity training and, therefore, can be regarded as committing academic misconduct intentionally. It also provides for increased penalties for repeat offenders. Last, (VII), we recommend a hierarchy of permission rights so that all staff and students have access to aggregate data via a dashboard. This dashboard will give continuous updates on how the University is progressing on the two key performance indicators for academic integrity: Common Knowledge Formation and the Number of Academic Misconduct Incidents.

This paper highlighted the significance of distinguishing between personal knowledge and common knowledge when designing effective academic integrity interventions. Future investigations should delve into the mechanisms and rationales underpinning the prevention of academic misconduct through the common knowledge factor, investigating its function as an intermediary variable. An interconnected matter pertains to devising measurement items that encompass the domain of common knowledge, enabling higher education institutions to employ dependable and validated scales for shaping pivotal performance metrics related to the cultivation of common knowledge.

Employing Kirkpatrick's Evaluation Model (Kirkpatrick and Kirkpatrick 2006) as a framework for both key performance indicators (KPIs) and the evaluation of academic integrity interventions stands as a logical starting point for research aimed at establishing the predictive and causal relationships bridging the foundational tiers of Reaction and Learning with the advanced stages of Behaviour and Results.

Conclusion

This paper presented a Model for Preventing Academic Misconduct based on a synthesis of the academic integrity literature. In the vein of proactive interventions, the model hypothesizes that a more material impact on reducing academic integrity will be realized with higher levels of implementation, such as mandatory faculty or school-level program-mandatory interventions or university-wide programming across all degree programs. For low levels of implementation, such as voluntary enrollment by individual students or even required components in random courses, the model hypothesizes that the impact will be negligible. The model for preventing academic integrity was assessed against reported academic misconduct incidents over a five-year period in the School of Business at MacEwan University, Canada. This period encompasses three years before a

school-wide mandatory academic integrity intervention was implemented and two years of post-intervention period, also overlapping with the COVID-19 outbreak in which the institution switched to an online modality. The preliminary results in this study provide tentative support for the assumptions of the Model for Preventing Academic Misconduct in that required academic integrity programming in program-wide introductory courses will prevent academic misconduct more than random events and courses. Future research will gather more institutional data to determine the long-term impact of preventing academic misconduct through mandatory academic integrity programming in core introductory courses. If higher education institutions want to be impactful in preventing academic misconduct, activities cannot be done voluntarily through random events and courses. Academic integrity activities must be required at the school or faculty level and for the most significant impact at the university-wide level. However, little research has been published on faculty and university-wide activities where institutional data on actual academic misconduct incidents are analyzed to validate academic integrity interventions.

Abbreviations

APA American Psychological Association
 AI Academic Integrity
 KPIs Key Performance Indicators

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Competing interests

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